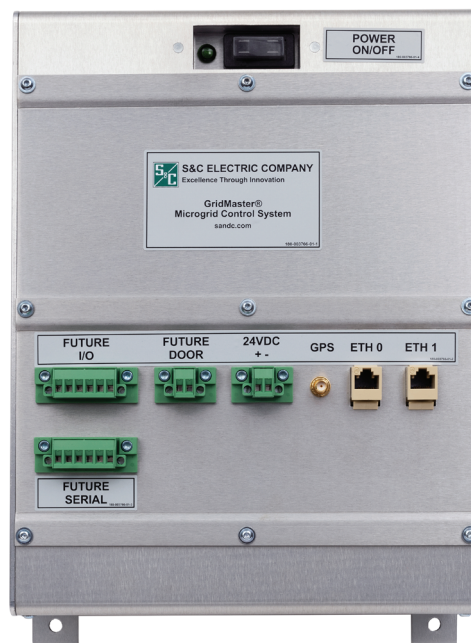


# Installation

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## Qualified Persons

### **WARNING**

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric power transmission equipment and distribution substation equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended **ONLY** for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

## Read this Instruction Sheet

### **NOTICE**

Thoroughly and carefully read this instruction sheet before installing or operating your GridMaster Microgrid Control System. Familiarize yourself with the Safety Information and Safety Precautions on pages 4 and 5. The latest version of this publication is available online in PDF format at [sandc.com/en/support/product-literature/](http://sandc.com/en/support/product-literature/).

## Retain this Instruction Sheet

This instruction sheet is a permanent part of your GridMaster Microgrid Control System. Designate a location where you can easily retrieve and refer to this publication.

## Proper Application

### **WARNING**

A GridMaster controller is only intended for use in the GridMaster Microgrid Control System. Application information for the GridMaster Microgrid Control System is listed in Specification Bulletin 1025-31 and on the system diagram drawings provided by S&C Electric Company.

## Operating Considerations

A GridMaster Microgrid Control System enables intelligent electronic devices to be incorporated into a microgrid. Each GridMaster controller operates as a member of a peer-to-peer network that ensures electrical demand is met while eliminating single points of failure. GridMaster controllers are used to monitor and switch new or existing renewable sources of energy such as wind and solar; critical and non-critical loads (prioritized load shedding); utility and non-utility sources of generation; and energy storage to allow for islanding of electrical loads. The GridMaster controller is also capable of recognizing when devices and equipment are unavailable and can compensate for such contingencies.

The GridMaster controller operates in tandem with the controls of its associated intelligent electronic device (IED). It does not directly provide switching capabilities but does interface with the IED controls to do so. For more information on the operation of the GridMaster Microgrid Control System, see S&C Instruction Sheet 1025-530, “GridMaster® Microgrid Control System: *Operation*.”

### Warranty

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale–Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale–Immediate Purchasers Outside the United States,") plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (or PRICE SHEET 153).

### Warranty Qualifications

Warranty of GridMaster Microgrid Control System is contingent upon the installation, configuration, and use of the control and software in accordance with S&C's applicable instruction sheets. This warranty does not apply to major components not of S&C manufacture, such as batteries, communication devices, and the IED associated with the controller. However, S&C will assign to the immediate purchaser or end user all manufacturers' warranties that apply to such major components.

Warranty of equipment/services packages is contingent upon receipt of adequate information on the user's distribution system, sufficiently detailed to prepare a technical analysis. The seller is not liable if an act of nature or parties beyond S&C's control negatively impact performance of equipment/services packages; for example, new construction that impedes radio communication, or changes to the distribution system that impact protection systems, available fault currents, or system-loading characteristics.

## Safety Information

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### Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to your GridMaster Microgrid Control System. Familiarize yourself with these messages and the importance of these signal words:

#### **DANGER**

“DANGER” identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

#### **WARNING**

“WARNING” identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

#### **CAUTION**

“CAUTION” identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

#### **NOTICE**

“NOTICE” identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

### Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C’s website [sandc.com](http://sandc.com), or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

#### **NOTICE**

Read this instruction sheet thoroughly and carefully before installing your GridMaster Microgrid Control System.



### Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd. The latest version is available online in PDF format at [sandc.com/en/Support/Product-Literature/](http://sandc.com/en/Support/Product-Literature/).

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

**⚠ DANGER**



**The GridMaster Microgrid Control System may be installed in equipment that operates at high voltage. Failure to observe the precautions below will result in serious personal injury or death.**

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

- |   |  |
|---|--|
| <ol style="list-style-type: none"> <li>1. <b>QUALIFIED PERSONS.</b> Access to the GridMaster Microgrid Control System must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.</li> <li>2. <b>SAFETY PROCEDURES.</b> Always follow safe operating procedures and rules.</li> <li>3. <b>PERSONAL PROTECTIVE EQUIPMENT.</b> Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.</li> </ol> | <ol style="list-style-type: none"> <li>4. <b>SAFETY LABELS AND TAGS.</b> Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels and tags. Remove tags ONLY if instructed to do so.</li> <li>5. <b>ENERGIZED COMPONENTS.</b> Always consider all parts live until de-energized, tested, and grounded.</li> <li>6. <b>MAINTAINING PROPER CLEARANCE.</b> Always maintain proper clearance from energized components.</li> </ol> |
|---|--|

## Shipping and Handling

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### Inspection

Examine the shipment for external evidence of damage as soon after receipt as possible, preferably before removal from the carrier's conveyance. Check the bill of lading to make sure all listed shipping skids, crates, and containers are present. If there is visible loss or damage:

1. Notify the delivering carrier immediately.
2. Ask for a carrier inspection.
3. Note the condition of shipment on all copies of the delivery receipt.
4. File a claim with the carrier.

If concealed damage is discovered:

5. Notify the delivering carrier within 15 days of receipt of shipment.
6. Ask for a carrier inspection.
7. File a claim with the carrier.

Also, notify S&C Electric Company in all instances of loss or damage.

### Packing

A complete GridMaster Microgrid Control System consists of the following components:

- The GridMaster controller
- This instruction sheet

**Before Starting****⚠ WARNING**

These instructions do not replace the need for utility operation standards. Any conflict between the information in this document and utility practices should be reviewed by the appropriate utility personnel and a decision made as to the correct procedures to follow.

A GridMaster Microgrid Control System is connected to equipment that may be operating at primary voltage levels. High voltage may be present in the wiring to the equipment's intelligent controls or to the equipment itself during certain failures of the equipment's wiring or grounding system, or because of a failure of the equipment itself. For this reason, access to the GridMaster controller should be treated with the same safety precautions that would be applied when accessing other high-voltage lines and equipment. Follow all locally approved safety procedures when working on or around the controller.

Before attempting to access an existing equipment installation, check carefully for visible or audible signs of electrical or physical malfunction. Do this before touching or operating the GridMaster controller or any other part of the installation. These warning signs include such things as smoke, fire, open fuses, crackling noises, loud buzzing, etc. If a malfunction is suspected, treat all components of the installation, including the GridMaster controller and associated mounting hardware, as though they were elevated to primary (high) voltage.

Whenever accessing or performing maintenance on the GridMaster controller, follow your company's operating procedures to disable automatic operation of the equipment to prevent unexpected operation of the equipment.

Familiarize yourself with the parts of a GridMaster controller. See Figure 1.

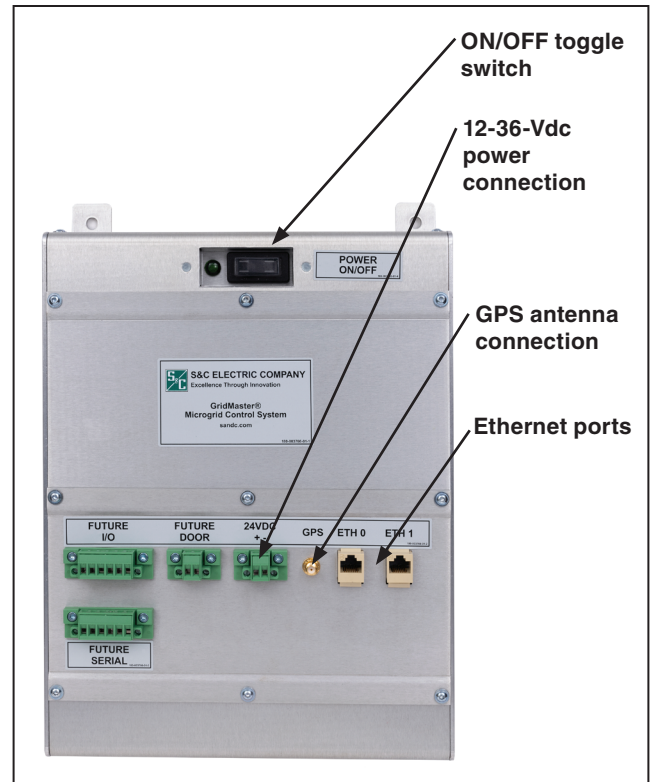


Figure 1. The wall-mounted GridMaster controller.

## Installation

### Wall-Mounted GridMaster Controller Installation

The wall-mounted GridMaster controller can be installed in a wide variety of enclosures. When S&C Electric Company provides the associated IED, the controller may be factory-installed inside the gear's low-voltage enclosure.

The wall-mounted GridMaster controller is 14 inches (356 mm) high, 9.25 inches (235 mm) wide, and 3.6 inches (91 mm) deep, flange-mounted with  $\frac{3}{8}$ -inch (9.5-mm) diameter mounting holes. The microgrid controller should be mounted in "open-construction" style so it may be easily connected to and serviced without requiring removal of the controller or surrounding equipment. The GridMaster controller should be mounted in an appropriate NEMA enclosure (or equivalent) for protection from weather, dust, and unintentional intrusion. When mounting the controller on a swing-out panel, make sure any communications cables are trained and/or harnessed in such a way movement of the panel will not loosen the connections.

To mount the GridMaster controller to the enclosure:

- STEP 1.** Tap four holes at the positions shown in Figure 2 on an interior panel of the NEMA enclosure. The mounting holes have a  $\frac{3}{8}$ -inch (9.5-mm) diameter.
- STEP 2.** Use a mounting screw appropriately sized for a  $\frac{3}{8}$ -inch (9.5-mm) hole and a flat washer to secure the controller inside the enclosure. When considering placement, make sure there is enough room to allow for the cables to protrude from the face of the controller.

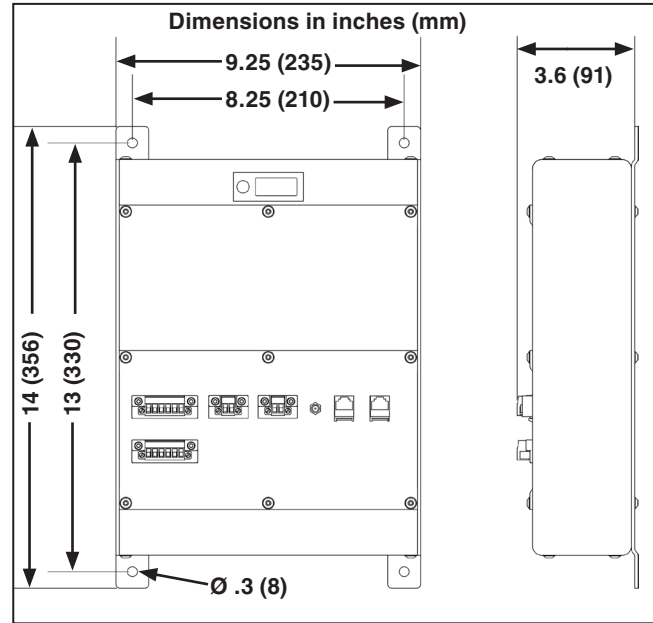


Figure 2. The wall-mounted GridMaster controller dimensions.



## Connecting Control Power, Data, and GPS

### Power and Ethernet Connections

The GridMaster Microgrid Control System has standard power and Ethernet connections and a coaxial port for connecting a GPS antenna. See Figure 3.

Complete the following steps to connect power, GPS, and Ethernet:

- STEP 1.** If present, connect the GPS antenna to the female coaxial connector on the controller.
- STEP 2.** Connect an Ethernet cable to the ETH 0 port on the controller. The other end of the cable may be connected to either a radio, a network switch, or directly to the local-area network on which the GridMaster Microgrid Control System will be interconnected.
- STEP 3.** If the associated IED communicates via Ethernet, connect an Ethernet cable to the ETH 1 port. (For other connection types, contact your local S&C Sales Office.)
- STEP 4.** The GridMaster controller can accept 12- to 36-Vdc (24-Vdc nominal) control power. Connect the positive/negative wires from the power supply to the appropriate power input terminals on the back of the controller. The terminal connections will accept 12–30 AWG wires.

S&C recommends the control power source be supported by an uninterruptable power supply with at least one hour capacity.



Figure 3. The power and Ethernet connections.

## Final Setup and Checkout

Before switching on and configuring the GridMaster Microgrid Control System according to the instructions in S&C Instruction Sheet 1025-530, check the following:

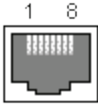
- STEP 1.** Make sure the GridMaster controller is securely installed in the enclosure. Check all fasteners for tightness.
- STEP 2.** Make sure all cable connections and wiring connections to the GridMaster controller are secure. If the controller is connected to a swing-out panel, make sure the cables are trained and/or harnessed so movement of the panel will not loosen the connections.
- STEP 3.** Turn on the control power to the GridMaster controller by toggling the ON switch at the top center of the control to the **On** position. The power indicator will illuminate.
- STEP 4.** Open a browser window and connect to the network to which the controller is connected. Connect to the controller by entering the address and log-in credentials securely supplied to you by S&C Electric Company. Detailed log-in and password-maintenance information can be found in S&C Instruction Sheet 1025-530.

## General Specifications

Control Voltage	12 to 36 Vdc
Operating Temperature	-40°C to +65°C (-40°F to +149°F)
Operating Humidity	95% non-condensing humidity
Altitude	2000 meters (6562 feet)

## Ethernet Pinout

Pin	Function
1	Data (TX +)
2	Data (TX -)
3	Data (RX +)
4	Ground (-)
5	Ground (-)
6	Data (RX -)
7	Power (+)
8	Power (+)

A diagram of an 8-pin Ethernet connector. The connector is shown in a perspective view, with the pins numbered 1 through 8 from top to bottom. The pins are arranged in a standard RJ45 layout.